REMARKS

Claims 10-20 remain pending. By the foregoing amendment, claim 13 has been amended to correct a typographical error noted in the Final Office Action by changing "high density polyethylene" to "acrylic," as recited in independent claim 10. No new matter is added. Entry of the amendment is appropriate under 37 C.F.R. § 1.116 and is respectfully requested.

Claims 10-14 and 16-20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Craig et al. U.S. Patent 6,580,079 ("Craig") and Odom et al. U.S. Patent 6,495,837 ("Odom '837"), and further in view of Grodzins U.S. 2005/0023479 ("Grodzins"). Claim 15 stands rejected under 35 U.S.C. § 103(c) as being unpatentable over Craig and Odom '837, and further in view of Koechner U.S. Patent 4,942,302 ("Koechner"). Each of these rejections is respectfully traversed.

Craig discloses a method of measuring a hydrogen-bearing constituent in a material. A plurality of radiation detectors 400 are spaced within a moderator 410 formed of graphite or a hydrogenous material such as water or polyethylene. The radiation detectors 400 may be formed as optical fibers arranged in layers or alternatively as ribbon or sheet. The scintillator material may be organic, inorganic, lithium silicate glass, or plastic (col. 5, lines 65 to col. 6, line 4). As the Final Office Action recognizes, Craig does not describe a neutron detector comprising a thermal neutron sensitive scintillator film interleaved with and optically coupled to an acrylic light guide-thermalizing media, as claimed in independent claims 10 and 18.

Odom '837 describes a fast neutron detector described as useful in borehole (e.g., underground) applications wherein a high energy neutron generator is used to stimulate elements, and returned scattered neutrons are detected. An acrylic light pipe is used primarily to provide hydrogen atoms from which the neutrons scatter and produce recoiling protons from the

hydrogen atoms within the material. The system detects recoil protons as they pass through thin ZnS scintillation layers. The system derives its sensitivity by capturing the ionizing energy of the moving recoil protons as they pass through the thin scintillation layer. This produces a relatively small signal and requires that the range of the recoil proton be sufficient to pass through the layer of plastic without stopping before it encounters the scintillation layer. Very low energy neutrons will produce recoil protons that have insufficient energy to pass through the plastic, and thus will not be counted. Thermal neutrons also are not counted because the ZnS scintillation layers are not sensitive to them.

In the broad spectrum neutron detector claimed in independent claims 10 and 18, thermal neutrons are captured in the ^{6}Li-ZnS scintillator films to produce high energy alphas which are contained within the capture-neutron doped sensor. There is essentially no contribution from recoil protons incidentally produced as the neutrons scatter down in energy, since their signal is below the electronic threshold.

Given these significant differences in function between broad spectrum- and fast neutron detectors, persons skilled in the art simply would not have looked to Odom '837 to modify Craig in the manner proposed in the Final Office Action. Significantly, neither reference describes or suggests employing a plurality of acrylic layers as both light guide <u>and thermalizing media</u>. As described, e.g., in ¶ 19 of the specification, the interleaved layers provide a much higher probability of thermal neutrons interacting with ^{6}Li as compared to a conventional cylindrical thermalizing mass surrounding a ^{3}He detector. The only suggestion to provide a plurality of acrylic light guide-thermalizing media layers comes from the hindsight gleaned by reading the present disclosure.

Grodzins is cited as disclosing ^{6}LiF-ZnS thermal neutron sensitive scintillator films. The Final Office Action acknowledges that only the Grodzins 60/476,101 provisional application is prior art since the Grodzins 10/861,332 non-provisional was filed after the filing date of the subject application. However, the Final Office Action continues to refer to Figures 3, 4, and 7, which were not disclosed in the '101 provisional and therefore are not prior art.

In any event, Grodzins does not describe or suggest a neutron detector having a plurality of ^{6}Li-ZnS films interleaved with and optically coupled to a light guide-thermalizing media comprising a plurality of acrylic layers, as claimed in independent claims 10 and 18. Therefore, Grodzins fails to remedy the deficiencies of Craig and Odom '837 as discussed above.

None of the cited prior art documents, whether taken alone or in combination, discloses or suggests a neutron detector having a plurality of ^{6}Li-ZnS films optically coupled to a light guide-thermalizing media comprising a plurality of acrylic layers, as set forth in independent claims 10 and 18. Dependent claims 11-14, 16, 17, 19, and 20 are allowable for at least the same reasons applicable to independent claims 10 and 18. Reconsideration and withdrawal of the § 103 rejection over Craig, Odom '837, and Grodzins are respectfully requested.

Koechner is cited as describing a wavelength shifter in conjunction with a scintillator. Koechner fails to disclose or suggest a neutron detector having the particular features recited in independent claim 10. Dependent claim 15 is allowable for at least the same reasons applicable to claim 10. Reconsideration and withdrawal of the rejection over Craig, Odom '837, and Koechner are respectfully requested.

Conclusion

In view of the foregoing, favorable reconsideration and allowance of the subject application are respectfully requested. The Examiner is invited to telephone the undersigned at the number listed below if doing so would be helpful to resolve any outstanding issues.

Respectfully submitted,

BANNER & WITCOFF, LTD.

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By: /Paul M. Rivard/
Paul M. Rivard
Registration No. 43,446

Customer No. 22907

1001 G Street N.W.
Washington, DC 20001
(202) 824-3000 (telephone)
(202) 824-3001 (facsimile)